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Art Unit: 1725

Confirmation No.: 4391

Application No.: 10/632,504

Title: METHOD AND APPARATUS FOR PRODUCTION OF A CAST COMPONENT

Inventor: Donald J. Frasier et al.

Filing Date: August 1, 2003

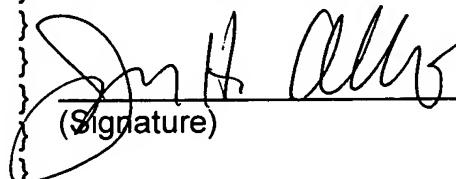
Attorney Docket No: RORO-177

Examiner: Tran, Len

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} John H. Allie

} (Printed Name)

APPEAL BRIEF

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Commissioner for Patents
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Sir:

Pursuant to the Notice of Appeal filed with the United States Patent Office on

August 1, 2006 in connection with the above-indicated application, an Appeal Brief

according to 37 CFR § 41.37 is provided. Also enclosed herewith is a Petition to

Request a one (1) Month Extension of Time to and including November 1, 2006, along

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with a credit card authorization form for the requisite fee under 37 CFR § 41.20 (b)(2) and 37 CFR § 1.17(a)(3). The Commissioner is authorized to grant any further extensions of time, and charge any deficiency or credit any overpayment to Deposit Account No. 12-2424, but not to include issue fees.

I. REAL PARTY IN INTEREST

Per 37 CFR § 41.37(c)(1)(i), the real party in interest is Rolls Royce Corporation, the assignee of record, which is a subsidiary of Rolls-Royce PLC.

II. RELATED APPEALS AND INTERFERENCES

Per 37 CFR § 41.37(c)(1)(ii), the applicants, the applicants' legal representative, and the assignee wish to make the U.S. Patent Office aware of another Notice of Appeal filed in Application No. 10/633,439. An appeal brief has not yet been submitted in the '439 Application. The applicants, the applicants' legal representative, and the assignee are unaware of any related appeals or interferences which will affect, be directly affected by, or have a bearing on the Appeal Board's decision in the present appeal.

III. STATUS OF CLAIMS

Per 37 CFR § 41.37(c)(1)(iii), the status of the claims is as follows. Claims 1-49, and 63-169 have been cancelled. Claims 50-62 are pending. Claims 50-62 stand rejected, and are being appealed on the grounds further explained hereinafter. The claims are presented in Appendix A in accordance with 37 CFR §41.37(c)(1)(viii).

IV. STATUS OF AMENDMENTS

Per 37 CFR § 41.37(c)(1)(iv), no amendments have been filed subsequent to taking this Appeal.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Per 37 CFR § 41.37(c)(1)(v), the following summarization provides a concise explanation of the subject matter defined in the independent claim involved in the appeal. This summarization refers to pages 64-69 of the present application and the figure designations of the present application, and all page and line numbers refer to the corresponding text of the present application.

Independent claim 50 is directed to a method for pouring molten metal into a casting mold within a vacuum furnace, an exemplary embodiment of which is illustrated in Figs. 52 and 53A-53E and described on page 64 line 13 to page 66, line 4 and page 67, line 14 to page 69, line 6. The method includes providing a crucible 122 with a discharge aperture 700 and a pour assembly located within the crucible, the pour assembly including an upstanding outer tube 257 positioned around an upstanding inner tube 256, the inner tube 256 is in fluid communication with the discharge aperture 700. The method includes melting a metal material 137 within the crucible to a liquid state, flowing the liquid state metal from the crucible into a cavity defined between the outer tube 257 and the inner tube 256, overfilling the cavity so that liquid state metal flows into and fills the inner tube 256, stopping the filling of the inner tube, and discharging the liquid state metal from the inner tube 256.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Pursuant to 37 CFR § 41.37(c)(1)(vi), review of the following issue is presented in this appeal: the rejection of claims 50-62 under 35 U.S.C. § 103(a) based upon U.S. Patent No. 5,335,611 to Paine (hereinafter "Paine") in view of U.S. Patent No. 833,150 to Attenhofer (hereinafter "Attenhofer").

VII. ARGUMENTS

The following remarks address the grounds of rejection in accordance with 37 CFR § 41.37(c)(1)(vii). The only rejection in present application is of claims 50-62 as obvious under 35 U.S.C. § 103(a) based upon U.S. Patent No. 5,335,611 to Paine in view of U.S. Patent No. 833,150 to Attenhofer. The seminal case directed to application of 35 U.S.C. § 103 is *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). From this case, four familiar factual inquiries have resulted. The first three are directed to the evaluation of prior art relative to the claims at issue, and the last is directed to evaluating evidence of secondary considerations. See, MPEP §2141.

The examiner bears the burden of establishing a *prima facie* case of obviousness. See, *In re Warner*, 379 F.2d 1011, 1016, 154 USPQ 173 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968). To meet this burden, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when

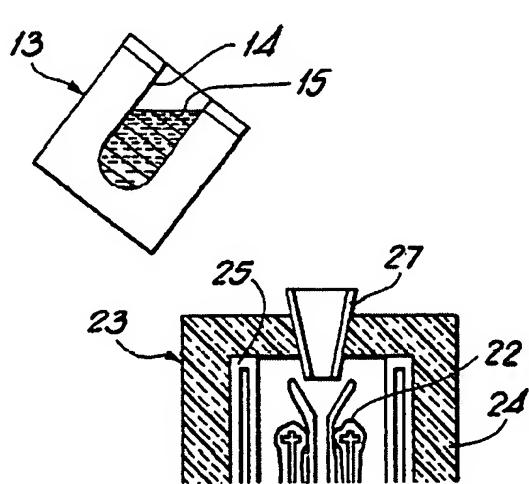
combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. See, MPEP § 2142, *citing In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). For the following reasons, these criteria have not been met and a *prima facie* case of obviousness has not been established.

A. The Asserted Combination Fails to Create a *Prima Facie* Case of Obviousness Since it Changes the Basic Principle of Operation of Paine

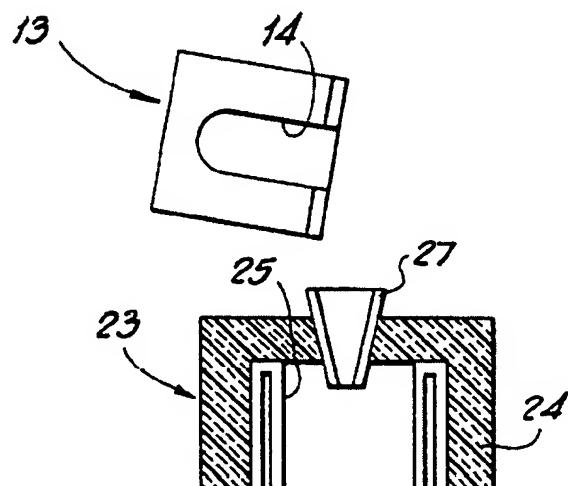
If a proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. See, MPEP 2143.01, *citing In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). *In re Ratti* reversed the rejection of claims directed to an oil seal comprising a bore engaging portion with outwardly biased resilient spring fingers inserted in a resilient sealing member. The primary reference relied upon in a rejection based on a combination of references disclosed an oil seal wherein the bore engaging portion was reinforced by a cylindrical sheet metal casing. The court reversed the rejection "since the suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate." *In re Ratti*, 270 F.2d 810, 813, 123 USPQ 349, 352 (CCPA 1959), cited by MPEP 2143.01.

The examiner's rejection suffers from the same deficiency as the rejection in *In re Ratti*. The rejection proposes modifying the Paine reference "to provide a dispensing means as taught by Attenhofer ..." Final Office Action, page 3. This modification would require a substantial reconstruction and redesign of the Paine reference and would change Paine's basic principle of operation.

Paine discloses a system that pours molten metal using a conventional tilt pour crucible: "[c]ontained in the chamber 11 is a coil box assembly 13 having induction heating coils (not shown) and crucible 14; the assembly 13 being mounted such that it may be tilted to pour the molten metal 15 in known manner." See, Paine, column 5, lines 20-24 (underlining added); also see column 6, lines 64-66 ("Operation of the apparatus [of Figs. 3 and 4] is essentially similar to that described with reference to FIGS. 1 and 2."). This principle of operation is illustrated in the following portions of Figs. 1 and 2 of Paine:



Portion of Fig. 1 of Paine



Portion of Fig. 2 of Paine

Assuming *arguendo* that the asserted combination of Attenhofer and Paine would even be operative, it would require a substantial redesign of Paine's crucible that would change its basic tilt-pour principle of operation. Attenhofer describes a rain water storage cistern A which has discharge pipe B that passes through its bottom and terminates a suitable distance from the top of the cistern. See, Attenhofer page 1, lines 9-11, and 54-63. Attenhofer does not disclose a tilt-pour system for discharging a molten metal. Rather, Attenhofer describes a system where water rises in a jacket C that surrounds a portion of the discharge pipe B until a stream of water flows into pipe B to produce a siphon which continues until the water level in the cistern reaches a fraction below a cap D. See, Attenhofer page 1, lines 63-106. Even if the water siphoning system of Attenhofer could somehow be added to the crucible of Paine, this combination would require a substantial redesign of Paine that would change Paine's basic tilt pour principle of operation. For at least this reason, the asserted combination of Paine and Attenhofer fails to create a *prima facie* case of obviousness.

B. The Asserted Combination Fails to Create a *Prima Facie* Case of Obviousness Since Attenhofer Teaches That it Would Render Paine Unsatisfactory for its Intended Purpose

It is well established that, "an applicant may rebut a *prima facie* case of obviousness by showing that the prior art teaches away from the claimed invention in any material respect." *In re Peterson*, 315 F.3d 1325, 1331, 65 USPQ2d 1379 (Fed. Cir. 2003). Furthermore, if a proposed modification renders a reference being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to

make the proposed modification. See, MPEP 2143.01, *citing In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

As stated above, the examiner's proposed combination is to add the discharge system of Attenhofer to Paine. See, Final Office Action, page 3. Attenhofer teaches that this combination would render Paine unsatisfactory for its intended purpose of metal casting. According to Attenhofer "any accumulation of sediment that may occur at the base of the jacket will be drawn up and carried out through the pipe B ..." See, Attenhofer page 1, lines 98-100. This contamination in the discharge of Attenhofer would render Paine unsatisfactory for metal casting since the contaminants would be introduced into the metal being cast which would result in defects.

Attenhofer's teachings cannot be avoided by the examiner's argument that "[i]n the casting art, the molten metal is always kept from impurities and the cleanest molten metal would be in the lower portion, therefore it would be desired to get the molten metal in the lower portion." See, Final Office Action, page 4. The Examiner's argument overlooks the fact that denser impurities would be present at the bottom of the molten metal and would be introduced into the mold by the proposed combination as explicitly stated by Attenhofer. Additionally, no argument about the casting arts can change Attenhofer's explicit teachings.

The examiner appears to have misunderstood Attenhofer teachings regarding the discharge of contaminants. The examiner mistakenly cites page 1, lines 12-33 of Attenhofer as teaching a discharge structure "for the purpose of eliminating any impurities in the water going to a cleaner source." See, Final Office Action, page 3. To

the contrary, Attenhofer states “any accumulation of sediment that may occur at the base of the jacket will be drawn up and carried out through the pipe B ...” See, Attenhofer, page 1, lines 98-100. Furthermore, Attenhofer discloses only one discharge route from the cistern. Thus, the examiner’s contention that Attenhofer somehow eliminates impurities from its discharge is physically impossible. Attenhofer teaches a single discharge which includes contaminants that will make it unsatisfactory for the very purpose that the examiner proposes it be used. Accordingly, the proposed combination of Paine and Attenhofer fails to establish a *prima facie* case of obviousness since Attenhofer teaches that it would render Paine unsatisfactory for its intended purpose.

C. The Examiner’s Rejection Is Based upon Impermissible Hindsight

The Federal Circuit has repeatedly admonished that “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992), quoting *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1998). This analysis is forbidden because it would “discount the value of combining existing features or principles in a new way to achieve a new result—often the very definition of invention.” *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275, 69 USPQ2d 1686 (Fed. Cir. 2004). The examiner has fallen into this forbidden analysis in rejecting the present application.

The examiner has not identified any suggestion, teaching or motivation to combine the tilt pour metal casting system of Paine with the discharge system of

Attenhofer's water storage cistern. The examiner does argue that the asserted combination "will eliminate impurities in the molten metal prior to introduction into the mold." See, Final Office Action, page 4. Yet, as explained above in section VII.B, Attenhofer contradicts this argument by expressly stating that contaminants are carried through its discharge system. See, Attenhofer, page 1, lines 98-100. Thus, the rejection has been made without any motivation or suggestion for the asserted combination.

In an attempt to counter the hindsight problem, the examiner has cited *In re McLaughlin*, 443 F.2d 1392 170 USPQ 209 (CCPA 1971). This authority stands only for the proposition that rejections are proper when they are based only on the knowledge which was within the level of ordinary skill in the art, and do not include knowledge gleaned from the applications disclosure. In the present application, the examiner has not offered any knowledge of those skilled in the art to support the combination of Paine and Attenhofer other than an argument that is contradicted by the very references the examiner seeks to combine. Thus, the examiner cannot rely upon such knowledge to insulate the present rejection from impermissible hindsight.

There are multiple indications that the present rejection is based upon impermissible hindsight. The proposed combination involves selectively taking particular pieces from a reference concerned with a cistern for rainwater storage, and adding them to a tilt pour crucible associated with the casting of molten metal. This unusual combination would change the manner of operation of the primary reference. Furthermore, reviewing these prior references teaches one skilled in the art that the

asserted combination would be unsatisfactory for its intended purpose. These indicia point to the conclusion that the examiner has engaged in impermissible picking and choosing of isolated elements found in prior art references while using the present application as a template for assembling them. For this reason no *prima facie* case of obviousness has been established.

D. The Attenhofer Reference Is Nonanalogous Art That Cannot Serve As the Basis for An Obviousness Rejection

As the examiner has acknowledged, "a prior art reference must either be in the field of applicants endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned in order to be relied upon as a basis for rejection of the claimed invention." Final Office Action, page 4, *citing In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). Attenhofer "relates to cisterns and tanks, and is designed more particularly for receiving and storing rain water." Attenhofer, page 1, lines 9-11. The present application relates to the pouring of molten metals. Attenhofer is not in the field of applicant's endeavor and the examiner does not even contend that it is.

It must also be considered whether Attenhofer is reasonably pertinent to the particular problem of the present application. The standard for making this determination is:

A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem. Thus, the purpose of the both the invention and the prior art are

important in determining whether the reference is reasonably pertinent to the problem the invention attempts to solve. If a reference disclosure has the same purpose as the claimed invention, the reference relates to the same problem, and that fact supports use of that reference in an obviousness rejection. An inventor may well have been motivated to consider the reference when making his invention. If it is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.

In re Clay, 23 USPQ2d 1058, 1061 (Fed. Cir. 1992). Attenhofer does not deal with any problem having a logical connection to the present invention. As an initial matter, the examiner has misunderstood the purpose of Attenhofer. The examiner cites page 1, lines 12-33 of Attenhofer as describing “the purpose of eliminating any impurities in the water going to a cleaner source.” See, Final Office Action, page 4. In fact, the cited portion of Attenhofer describes two different purposes: permitting the discharge of water within a cistern that is supporting a layer of oil so that insects cannot gain access to the water without disturbing the oil, and discharging sediment and water at the bottom of the cistern through the same pipe. See, Attenhofer, page 1, lines 11-33 and Fig. 1. When the purposes of Attenhofer are correctly stated, it is apparent that they are not reasonably related to pouring molten metal. Supporting a layer of oil to exclude insects and removing sediment from the bottom of a cistern by discharging it with water at the bottom of the cistern, are problems so unrelated to pouring molten metal as to have essentially no logical relationship to the problem addressed by the present invention. Thus, Attenhofer is nonanalogous art that cannot be used as a basis for the present obviousness rejection.

E. The Asserted Combination of Paine and Attenhofer Does Not Teach or Suggest All the Limitations of Multiple Claims

As stated above, a *prima facie* case of obviousness requires that a proposed combination of references teach or suggest every claim limitation. The examiner's rejection fails to teach or suggest every element of multiple claims. The following groups of claims are presented for independent consideration.

1. The Proposed Combination Fails to Teach or Suggest The Claimed Providing Limitation

Independent claim 50 recites "providing a crucible with a discharge aperture and a pour assembly located within the crucible, the pour assembly including an upstanding outer tube positioned around an upstanding inner tube, the inner tube is in fluid communication with the discharge aperture." As was noted above, the examiner's proposed combination is to add the discharge structure of Attenhofer to the tilt-pour crucible of Paine. This proposed combination would not constitute providing a crucible with a discharge aperture and a pour assembly located within the crucible. Since Attenhofer teaches that its discharge assembly passes contaminants along with water, it is not a suitable pour assembly since it would be introducing contaminants to the mold. See, Attenhofer, page 1, lines 98-100. Paine does not teach or suggest providing a pour assembly located within the crucible since Paine pours by tilting the crucible. See, Paine, column 5, lines 20-24. For at least these reasons, the proposed combination

does not teach or suggest all the limitations of claim 50, and the obviousness rejection of claim 50 and claims 51-62 which depend therefrom should be reversed.

2. The Proposed Combination Fails to Teach or Suggest the Claimed Applying a Positive Pressure Limitation

Dependent claims 52 recites "applying a positive pressure to the molten metal within the crucible." The proposed combination does not teach or suggest this limitation. Paine teaches a tilt pour crucible and includes no statement or suggestion of applying a positive pressure to the molten metal within the crucible. Attenhofer never mentions molten metal of a crucible at all, let alone applying a positive pressure to molten metal within a crucible. The only statement in Attenhofer even remotely related to pressure is that "a full stream of water will pour down pipe B and produce a siphon ..." See, Attenhofer, page 1, lines 93-94. For at least these reasons, the obviousness rejection of claim 52 and claims 53 which depends therefrom should be reversed.

3. The Proposed Combination Fails to Teach or Suggest the Claimed Nozzle Limitations

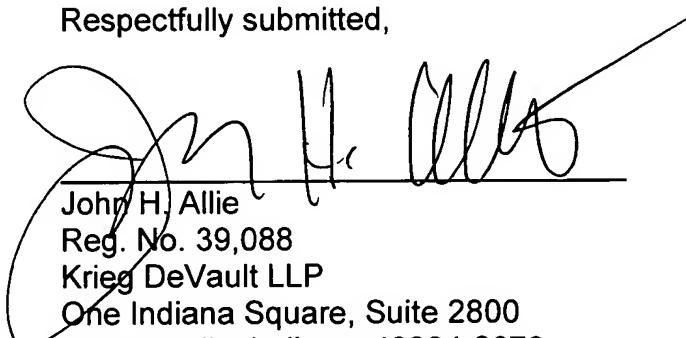
Claim 57 recites "providing a nozzle in flow communication with the discharge aperture, and which further includes flowing a quantity of molten metal into the cavity to heat at least a portion of the nozzle." Similarly, claim 60 recites providing a nozzle in flow communication with the discharge aperture and extending therefrom; and ... positioning the nozzle adjacent an inlet to the casting mold prior to said discharging." The proposed combination does not teach or suggest a nozzle, let alone a flowing a

quantity of molten metal into the cavity to heat at least a portion of the nozzle or positioning the nozzle adjacent an inlet to the casting mold prior to said discharging. For at least these reasons, the proposed combination does not teach or suggest all the limitations of claim 57 or claim 60, and the obviousness rejection of claim 57, claim 60 and claims 61-62 which depend therefrom should be reversed.

VIII. CONCLUSION

For the foregoing reasons, reversal of the rejection of claims 50-62 by the Appeal Board is respectfully requested.

Respectfully submitted,



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EVIDENCE APPENDIX

[NONE]

CLAIMS APPENDIX

50. A method for pouring molten metal into a casting mold within a vacuum furnace, comprising:

providing a crucible with a discharge aperture and a pour assembly located within the crucible, the pour assembly including an upstanding outer tube positioned around an upstanding inner tube, the inner tube is in fluid communication with the discharge aperture;

melting a metal material within the crucible to a liquid state; flowing the liquid state metal from the crucible into a cavity defined between the outer tube and the inner tube;

overfilling the cavity so that liquid state metal flows into and fills the inner tube; stopping the filling of the inner tube; and discharging the liquid state metal from the inner tube.

51. The method of claim 50:

wherein in said providing the outer tube has a plurality of inlet apertures;

wherein said flowing involves passing the molten metal through the plurality of inlet apertures; and

which further includes increasing the pressure differential between the discharge aperture and the molten metal within the crucible.

52. The method of claim 51, wherein said increasing includes applying a positive

pressure to the molten metal within the crucible.

53. The method of claim 52, wherein said applying a positive pressure includes advancing the unmelted metal material stock into the molten metal within the crucible.

54. The method of claim 50, wherein said flowing includes creating a pressure differential between the molten metal within the crucible and the cavity between the outer tube and the inner tube, and wherein the pressure on the molten metal in the crucible is greater than the pressure within the cavity between the outer and inner tube.

55. The method of claim 54, wherein said overflowing of the cavity includes maintaining a pressure differential between the molten metal in the crucible and the cavity between the outer tube and the inner tube, and wherein the pressure on the molten metal in the crucible is greater than the pressure within the cavity between the outer and inner tube.

56. The method of claim 55, wherein said stopping occurs when the pressure in the cavity between the inner and outer tube is greater than the pressure of the molten metal within the crucible.

57. The method of claim 50, which further includes providing a nozzle in flow communication with the discharge aperture, and which further includes flowing a

quantity of molten metal into the cavity to heat at least a portion of the nozzle.

58. The method of claim 50, which further includes sensing the discharge of molten metal from the discharge aperture, and upon said sensing said stopping occurring.

59. The method of claim 50, which further includes providing a casting mold adapted to receive the molten metal, and which further includes connecting the discharging of the molten metal with the casting mold in a confined passageway.

60. The method of claim 59:

which further included providing a nozzle in flow communication with the discharge aperture and extending therefrom; and
which further includes positioning the nozzle adjacent an inlet to the casting mold prior to said discharging.

61. The method of claim 60, wherein said discharging delivers a substantially vertical stream of molten metal.

62. The method of claim 60, which further includes moving the casting mold to align the casting mold inlet with the nozzle.

RELATED PROCEEDINGS APPENDIX

[NONE]